

15th, and on the Texas coast on the 30th. These warnings were justified by subsequent conditions, and no general storm occurred without warning.—*I. M. Cline.*

#### DENVER FORECAST DISTRICT.

On the morning of the 1st, freezing weather in western Colorado, with temperatures as low as 22° in the elevated portions of northern Arizona and southern Utah attended an area of moderately high pressure whose crest was over the last-named State. A HIGH which moved with increasing intensity from the north Pacific coast on the 2d to South Dakota and Nebraska on the 4th was attended by light showers in eastern Colorado on the 3d and by killing frosts in the northeastern portion of this State on the morning of the 4th. Occasional showers in the northern portions of the district on the 5th, and also in Colorado on the 6th, attended a LOW which advanced northeastward from Arizona on those dates. The succeeding HIGH which overspread the northern Rocky Mountain States on the 6th and 7th was attended by freezing temperature in north-central Arizona on the 7th and 8th and by frosts in extreme northeastern Colorado on the 8th, when the crest of the HIGH was over the Dakotas. Showery conditions in northern Colorado on the 10th, 11th, and 12th, and in about all of the district on the 13th and 14th, resulted from two separate disturbances which advanced eastward from Arizona. Frost occurred in north-central Arizona, north-central New Mexico, and southeastern Colorado, and freezing temperatures in north-central Colorado on the 15th, followed by killing frosts and freezing temperatures in northeastern Colorado on the 16th, due to an area of high pressure which developed over the Northern Rocky Mountain States on the 14th and moved southeastward to western Kansas and northwestern Texas by the morning of the 16th. Low pressures prevailed in most of the Rocky Mountain region from the 16th to the 31st, with scattered showers and thunderstorms in Colorado and occasionally in Utah. During the 31st the Plateau LOW advanced with increasing intensity from Utah to southeastern Wyoming, where it recurved to the northwestward, its center on the following morning being over extreme northern Idaho. This unusual action of the disturbance was followed by a sharp fall in temperatures in extreme western Colorado, northern Arizona, and southern Utah, amounting to a local cold wave at Flagstaff, where the minimum temperature was 24°. The lowest temperature on record for the first decade in June, 22°, occurred at Modena.

Frost warnings were issued almost daily for some part of the district, especially the higher elevations, from the 1st to the 15th and again from the 21st to the end of the month.

As a rule the frost and freezing temperature warnings distributed were verified.—*J. M. Schrier.*

#### SAN FRANCISCO FORECAST DISTRICT.

No severe storms visited this district during the month. Storms moving southeastward from the north Pacific passed inland at a high latitude, and thence either eastward through Canada or southward along the western slope of the Rocky Mountains to Arizona and New Mexico and then east. On one or two occasions storms developed over the southern Plateau and moved eastward.

While the storms passed inland too far north to cause gales along the northern coast, they gave frequent

showers in the North Pacific and Plateau States. The showers were generally light and in some instances were accompanied by thunderstorms. No damage was reported either from heavy rain or lightning.

No severe frosts occurred in the fruit centers, and the special fruit-frost service closed for the season in all portions of this district during the latter part of the month.

No storm warnings were issued during the month.

Live-stock warnings were issued in eastern Washington, eastern Oregon, and Idaho on the 25th. They were timely and verified.—*G. H. Willson.*

#### RIVERS AND FLOODS.

By H. C. FRANKENFIELD, Meteorologist.

While nearly all the rivers east of the Mississippi River, except those of the Middle Atlantic system, were in flood at some time during the month of May, the floods were short and moderate for the most part, except in the Tombigbee River of Alabama, which, below the mouth of the Black Warrior River, had been in flood almost continuously since March 23, with a crest stage of 51.4 feet, or 12.4 feet above flood stage, on March 30. The highest stage reached in May was 47.2 feet on the 22d, and the river did not fall below the flood stage until June 6, another crest of 46.9 feet having been reached on June 3. Damage and loss amounted to about \$16,000, while partial returns showed a saving of \$10,700 through the warnings issued.

As the interval between the April and May floods in the Pearl River of Mississippi had been so short, farming and stock operations had not been undertaken, and there was therefore little or no damage done, but logging and sawmill operations continued inactive through virtually all of May and the losses were very heavy.

The floods in the Wabash and White Rivers of Indiana, while moderate, overflowed more than 5,000 acres of corn and wheat and caused losses in prospective crops of about \$31,000, and other property losses of about \$3,000. The value of property saved through the warnings was about \$23,000. One life was lost near Prairietown, Ind.

The Yazoo River of Mississippi remained in flood throughout the month.

Warnings for all floods were issued at the proper time.

A severe flood occurred in the Ouachita River in Arkansas during the third week of the month. It was caused by a 48-hour rainfall of from 5 to 8 inches, and although warnings were issued as soon as information of the heavy rain was received, it was impossible in some localities to effect the entire removal of live stock and other portable property. At Arkadelphia, Ark., the Ouachita River rose from 2 to 23 feet during the 24 hours ending at 7 a. m. May 15. This crest stage of 23 feet was 5 feet above the flood stage and 0.4 foot above the previous high-water mark of May 12, 1920. At Camden, Ark., the crest stage on May 18 was 9.9 feet above the flood stage of 30 feet. Below Arkadelphia the rainfall was not so heavy, and flood stages were not reached south of the Arkansas-Louisiana boundary. One colored man was drowned, 2,000 acres of farm lands were overflowed, and 600 head of live stock were lost. Crop losses were about \$50,000 and those of live stock \$10,000, mostly in the vicinity of Arkadelphia. Below this place there was time after the receipt of the warnings to remove stock, etc., and no losses were reported.